Human-Robot Dynamic Social Interaction
NTT9904-01

Progress Report: July 1, 2001—December 31, 2001

Rodney Brooks

Project Overview

NTT researchers are interested in the question of whether a physical robot produces a more direct emotional coupling with human beings than does a computer generated graphical image of a similar robot. At MIT we are building a robot that has human-like facial expressions and shoulder and neck gestures, and that perceives human motion and facial expressions. This is coupled to an emotional system so that the person and the robot naturally follow normal human communication social dynamics. This robot will be installed at the NTT Communications Science Laboratories in Kyoto where the response of human subjects will be measured and compared to their response a graphical face interface.

Progress Through December2001

After initial experience with the Kismet 2 delivered to NTT in the second half of 2000, and with our own version of that robot (Lazlo), we realized that there needed to be some redesign of the robot before the final version was constructed. During the previous six months we completed that redesign and commenced fabrication of the final pair of robots (one for NTT and one to stay here at MIT). During this six month period we completed the fabrication of the NTT robot. There were a number of difficult mechanical issues that we had to solve. They have all been solved.

We built a new control system for the robot that runs under QNX. It is compatible with the existing hardware at NTT. The new control system is able to control all 30 motors in the new Kismet robot, and provides a substrate for NTT researchers to build their higher level control systems.

We completed work on a new set of vision and control libraries for NTT. These all run under the QNX operating system. We have made them somewhat robot independent and have tested them on three robot platforms at MIT—Cog, Lazlo, and the original Kismet. The vision libraries provide a number of capabilities not currently available at NTT. They include a log-polar based vision system, a visual attention mechanism, visual capabilities such as smooth pursuit and the vestibular-ocular reflex, and face finding. During this last six months we did extensive work on making these libraries robust and providing documentation of them.

Research Plan for the Next Six Months

During the period from January 2002 to June 2002 we will complete the new facial system for Kismet. We will provide training in the use of the robot to our NTT colleagues. We will deliver it to NTT.

We will build a set of libraries for facial expressions and deliver these and all other software libraries to NTT.